Approved For Release 2004/03/26 : CIA-RDP78B04747A002200020001-5

~~99065~~ 99265

10 February 1965

DEVELOPMENT OBJECTIVE

AN ADVANCED LIGHT TABLE AND MOUNT FOR A [redacted] VERSATILE (INTERCHANGABLE RHOMBOID) STEREOSCOPE

STAT

1. Introduction

These development objectives describe the requirements to be met in the design and development of a specially configured light table which incorporates an integral, precision mount for a government-furnished, [redacted]-manufactured versatile stereoscope.

STAT

2. Concept

This development is directed toward the design and fabrication of a prototype light table and microscope mount. The mount will be designed to accommodate an existing [redacted] Versatile Stereoscope, and the table is intended to provide ease of viewing, easy film loading, adequate illumination and a superior, vibration free, precision microscope mount for the [redacted] Versatile Stereoscope.

STAT

STAT

3. General Description

This table will provide two parallel 11" by 20" illuminated areas for use in viewing dual or single rolls of film of any size between and including 70mm and 9½ inches.

These viewing areas will be side by side with the long axes aligned toward, and away, from the operator. They will be mounted horizontally and will be built into an elevating table. In addition, a mounting will be incorporated to rigidly support the microscope at the correct height above the light table surface. Provision will be made for the microscope to translate in both x and y.

4. Requirements

4.1 Illumination Systems.

4.1.1 General Illumination. To facilitate general viewing at the lower magnifications and for small image location, both of the 10" by 20" glass formats shall be illuminated by fluorescent-type illumination.

DECLASS REVIEW by NIMA/DOD

Approved For Release 2004/03/26 : CIA-RDP78B04747A002200020001-5

Approved For Release 2004/03/26 : CIA-RDP78B04747A002200020001-5

4.1.1.1 Intensity Range. At full intensity, each general illumination system (left and/or right) must provide at least 1700 foot-lamberts measured at the illumination surface. Illumination shall not vary by more than 10% between any two points on the entire illuminated surface.

4.1.1.2 Variability of Intensity. The intensity of illumination of each (left and/or right) 10" by 20" area shall be independently and continuously variable through a range of 15% - 100% of full intensity without visible evidence of "flicker".

4.1.1.3 Heat. The general illumination source must be able to function continuously at maximum intensity over a 24-hour period, in a room with an 80°F ambient temperature, without exceeding 110°F on any external surface of the light table.

4.1.1.4 Diffuser. An opal glass or similar diffuser shall be located between the light source and the clear glass top.

4.1.1.5 Shades. Adjustable shades must be provided to mask out all of the viewing surface not actually covered by film. Each of these shades must be located beneath the surface glasses, mounted along the long dimensions of each 10" by 20" unit and extendable across the short dimension. The shades must extend from a minimum of (0) zero inches to a maximum of 9 inches. These shades must not encroach upon the illuminated viewing area when retracted and, in addition, must be able to be locked in any extended or retracted position.

4.1.2 High-Intensity Illumination System.

4.1.2.1 General. Two high-intensity (possibly condenser-type) light sources (HILS) shall be provided. They should be positioned between the general illumination light source and the surface glass plate.

4.1.2.2 Independent Adjustment. Each of the (HILS) shall be independently adjustable in the x and y axes in such a manner that it can be positioned beneath the separate objective in each rhomboid. These two (HILS) must be capable of a minimum separation (between them) of 50mm, center to center: 40mm is a design goal. Provision should be made for disconnecting or deactivating these sources and moving them out of the general illumination area when they are not required.

Approved For Release 2004/03/26 : CIA-RDP78B04747A002200020001-5

Approved For Release 2004/03/26 : CIA-RDP78B04747A002200020001-5

4.1.2.3 Independent Adjustment Control. Controls must be provided for regulating these independent adjustments.

4.1.2.4 Common Tracking Motion. Once the initial, independent adjustment necessary to align the (HILS) with the objective lenses of the rhomboids has been made, the light sources shall be locked in common synchronized motion. Thus, when the microscope is translated, the two high-intensity sources will track while retaining their previous alignment with the microscope's objectives. These (HILS) must track throughout the total scan range of the microscope (x and y translation) plus all possible rhomboid positions.

4.1.2.5 Intensity Range. At full-intensity, the high-intensity sources must provide adequate illumination of a film area with an average density of 2 units as viewed through the optical system of a STAT [redacted] Versatile Stereoscope operating at a magnification of 120x. All other magnification settings of this instrument shall be equally well illuminated. These sources shall operate at a color temperature between 3500° - 5500°K.

4.1.2.6 Variability of Intensity. Means shall be provided for continuously varying illumination from at least 50% to 100% of full intensity on each independent high-intensity source. Any reduction of intensity within this range shall not lower Kelvin temperature below 3500° K. On and off switches must be provided for each high-intensity source.

4.1.2.7 Heat. Temperature of the film (average density of two units) shall not exceed 50°F above ambient after being stationary for 30 minutes in the high-intensity light path under maximum illumination. The temperature of the light table's outside skin (including the top glass plate) shall not exceed 50°F above ambient when continuously operated for an eight-hour period with film (2.0 density) on the table and with both condenser and general illumination operating at maximum intensity.

4.2 External Configuration.

4.2.1 Size. The entire unit should not exceed approximately 45" width and must not exceed 37" depth.

4.2.2 Weight. The unit must remain as light as possible without sacrifice of good stability.

4.2.3 Comfortable Viewing Position. The light table and the translating microscope mount must be designed to offer the microscope at a comfortable viewing height and in a comfortable working position. Human engineering factors should count strongly in the new design. It is understood of course, that these positions also depend on the height of the illuminated surface, the requirement for the rhomboid to adequately

Approved For Release 2004/03/26 : CIA-RDP78B04747A002200020001-5

Approved For Release 2004/03/26 : CIA-RDP78B04747A002200020001-5

clear the film and the varying working distances of the microscope's rhomboids.

4.2.4 Elevating Table. The light tables and stereoscope mount shall be built on, or as an integral part of, an elevating table. This table shall be adjustable ± 5 inches in height from a normal desk height of 29".

4.3 Spool Loading and Holding Mechanism.

4.3.1 Loading Mechanism. A means shall be provided for the fast loading and unloading of dual or single spools of 70mm through 9" film. Rolls will range up to, and including, 500-foot capacity. This loading system must operate quickly and at the same time be positive in action: i.e., it must not drop the heaviest full spool (9½", 500 feet) no matter how fast or hard the film is cranked. A "drop-in" film loading system is desirable.

4.3.2 Holding Mechanism. The holding mechanism which engages and secures the spool must be designed for easy one-hand operation -- so that the film can be held in one hand while the holding mechanism is activated with the other. A positive but quick release lock must be incorporated.

4.4 Film Transport.

4.4.1 General. Superior film transport systems shall be provided to permit bi-directional film motion which is controllable from the operators end: i.e., it will permit both winding and unwinding with one set of cranks or motor switches, from one end of the table. This transport system may be motor driven, mechanical or electro-mechanical; however, basic simplicity of design and complete reliability are mandatory.

4.4.2 Film Capacity. Each individual film transport system must accommodate loaded spools of up to, and including, 500-foot capacity.

4.4.3 Film Direction. Film spools may be located at both ends or at one end of the long dimension of the viewing area, with the film or films transported along (and parallel to) the long axes of the light tables. When two rolls are used, the film strips will travel parallel to each other and to the long axis of the tables, with a minimum separation between strips.

4.4.4 Rollers. Rollers must be designed so that film can be transported either emulsion-up or emulsion-down without scratching.

4.4.5 Film Tension. The film transport mechanism must maintain a very light, constant, even tension on the film or films. (1 or 2 pounds) -- just enough to keep the film flat and in contact with the plate glass surface when the film is stationary. This tension should be automatically reduced or eased when the film is moved.

Approved For Release 2004/03/26 : CIA-RDP78B04747A002200020001-5

Approved For Release 2004/03/26 : CIA-RDP78B04747A002200020001-5

4.4.6 Film Drive.

4.4.6.1 Drive Modes. The film drives must: wind and unwind single or dual rolls of 70mm through 9½" wide film; be capable of winding one set of rolls while unwinding the other set; and/or permit one roll to remain stationary while the other roll is translated.

4.4.6.2 Drive Control. The drive controls may be hand cranks or electrical switches; however, they must have a high degree of sensitivity.

4.4.6.3 Dual-Speed Range. A dual-speed range with a high or "slew" speed shall be provided.

4.4.6.4 Reliability and Efficiency. Whatever the system, it must be very reliable. Each individual hand crank or motor must wind or unwind film very smoothly -- from either its own spool or the spool at the other end of the table. The drive must be a low-friction system which incorporates inertia damping and anti-backlash features. The efficiency, reliability and ease of operation of the drive system is an important consideration in this development.

4.5 Film Hold Down. A system must be provided for maintaining the film in the focus field at all magnification settings. This may be accomplished through pressure plates, vacuum and/or positive air pressure, etc. Particular attention must be given to the problem of handling two different-sized films at the same time.

4.5.1 Removable Plates. Support plates and pressure plates (if used) must be easily removable for cleaning and replacement.

4.5.2 Adjustment for Different Film Sizes. If a vacuum system is used, adjustment for different film sizes must be convenient and rapidly accomplished.

4.5.3 Pull-Down Time. Not more than 10 seconds shall be required for pull-down.

4.5.4 Automatic Operation. After the film is properly loaded, sealing, breaking, transport and resealing must be accomplished without further manual film handling.

4.5.5 Optical Quality. The film flattening system shall not in any way detract from the optical performance or imagery presentation of the Versatile Stereoscope.

4.6 Stereoscope Mount.

4.6.1 General. A rigid, precision mount shall be provided to place a STAT Versatile Stereoscope in correct position for focus and for comfortable

Approved For Release 2004/03/26 : CIA-RDP78B04747A002200020001-5

Approved For Release 2004/03/26 : CIA-RDP78B04747A002200020001-5

viewing of film materials located on the twin 10" by 20" viewing areas.

4.6.2 Focus. An excellent focusing motion, both fine and course, is a part of the existing stereoscopes. The use of this, or an alternative motion, may be proposed; however, if an alternative motion is proposed, it must be equivalent or superior to the current system.

4.6.3 Amount of translation. The stereoscope in its mounting must be able to translate ± 6" in x and ± 3" in y -- these distances refer to displacement of the center of the scope.

4.6.4 Carriage motion. The carriage motion of the mount must be smooth, positive, low-friction and free of vibration ("chatter"). The friction load must be consistent motion with no position of lesser or greater resistance. A gear or screw motion rather than a sliding motion would be acceptable.

4.6.5 Locks. Positive locks must be provided to lock the mount's carriage in x and y, at any position of its travel.

4.6.6 Mount Rigidity. Because of the high magnification, small depth of focus and long cantilever of the rhomboid relay systems, the Versatile Stereoscope is extremely susceptible to vibration. This mount must be very rigid so that, when the operator views through the Versatile Stereoscope at 120x, there is no apparent vibration.

4.6.7 Human Engineering. Human engineering factors must be thoroughly considered in selecting the mounting position of the stereoscope.

4.7 Miscellaneous.

4.7.1 Construction. Construction shall meet the highest commercial standards.

4.7.2 Shock Hazard. The unit must be grounded and free of all shock hazards.

4.7.3 Warning Light. Warning lights must show when the unit is on -- even if the (table) light intensities are turned completely down.

4.7.4 Controls. All operational controls must be conveniently located and readily accessible for the operator. Human engineering factors must be thoroughly considered in the design and placement of these controls.

STAT 4.7.5 The Stereoscope [ ] Versatile) will be GFE and is not a part of the contract.

4.7.6 Safety Features. Safety features must be incorporated to prevent the rhomboids from being damaged when the scope is translated.

Approved For Release 2004/03/26 : CIA-RDP78B04747A002200020001-5